

# **COLD INJURIES: DESCRIPTION, TREATMENT AND PREVENTION**

**Presenter's Name**  
**Presenter's Command**  
**Local Contact Information**

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**<http://chppm-www.apgea.army.mil>**

# Introduction

Prevention of cold injuries is a  
Command and Individual  
Responsibility

**ALL COLD WEATHER INJURIES ARE  
PREVENTABLE!!!**

# Outline

- Susceptibility Factors
- Cold Weather Injuries
  - description
  - treatment
  - prevention
- Conclusion

# Regulation of Body's Temp

- Body's heat production
  - metabolism
  - exercise
  - shivering
- Heat loss
  - convection
  - conduction
  - radiation
  - respiration
  - evaporation

# Typical Victim of a Cold Weather Injury

- Male
- E-4 or below
- Approximately 20 years old
- From a warm climate
- Less than 18 months time in service
- Uses tobacco, alcohol or medications
- Neglects proper foot care

# Susceptibility Factors

- Previous cold weather injury
- Inadequate nutrition
- Alcohol, nicotine use
- Dehydration
- Overactivity (sweating)
- Underactivity
- Long exposure to the cold
- Sick or injured
- Acclimatization
- Ethnic/geographic origin
- Wind, cold, rain
- Age
- Discipline and morale
- Physical stamina
- Inadequate training
- Poor clothing and equip

# Types of Cold Injuries

- Hypothermia
- Frostbite
- Chilblains
- Immersion/Trench Foot
- Dehydration
- Carbon Monoxide Poisoning
- Snow Blindness
- Sunburn

# Hypothermia

- MEDICAL EMERGENCY; life threatening condition
- Severe body heat loss-body temp falls below 95°F
- Occurs when:
  - conditions are windy, clothing is wet, and/or the individual is inactive
  - extended water exposure or immersion
    - 1 hour or less when water temp is below 45°F
    - prolonged exposure in slightly cool water (e.g. 60°F)
    - thunderstorms, hail, rain and accompanying winds



# Hypothermia

The “umbles”-stumbles, mumbles, fumbles, and grumbles

- Initial Symptoms

- shivering
- dizzy, drowsy
- withdrawn behavior
- irritability
- confusion
- slowed, slurred speech
- altered vision
- stumbling

- Severe Stages

- stops shivering
- desire to lie down and sleep
- heartbeat and breathing is faint or undetectable
- unconsciousness followed by DEATH

# Hypothermia

- Treatment

- prevent further cold exposure
- evacuate immediately if severe hypothermia
- remove wet clothing
- rewarm in a warmed sleeping bag
- warm, sweet liquids if conscious
- minimize handling of the unconscious victim so as to not induce a heart attack.

# Hypothermia

- Prevention

- eat properly and often
- warm liquids and water
- wear uniform properly (layers worn loosely)
- keep active
- stay dry
- warming tents
- get plenty of rest
- buddy watch/observation/NCO checks

<b>BODY TEMP</b>	<b>SYMPTOMS</b>	<b>OBSERVABLE IN OTHERS</b>	<b>FELT BY YOURSELF</b>
<b>(Early Stage) 98.6 ⇒ 95.0</b>	<b>Intense and uncontrollable shivering; ability to perform complex tasks impaired</b>	<b>Slowing of pace. Intense shivering. Poor coordination.</b>	<b>Fatigue. Uncontrollable fits of shivering. Immobile, fumbling hands.</b>
<b>(Moderate Stage) 95.0 ⇒ 91.4</b>	<b>Violent shivering persists, difficulty in speaking, sluggish thinking, amnesia begins to appear.</b>	<b>Stumbling, lurching gait. Thickness of speech. Poor judgment.</b>	<b>Stumbling. Poor articulation. Feeling of deep cold or numbness.</b>
<b>(Severe Stages) 91.4 ⇒ 87.8</b>	<b>Shivering decreases; replaced by muscular rigidity and erratic, jerky movements; thinking not clear but maintains posture.</b>	<b>Irrationality, incoherence. Memory lapses, amnesia. Hallucinations. Loss of contact with environment.</b>	<b>Disorientation. Decrease in shivering. Stiffening of muscles. Exhaustion, inability to get up after a rest.</b>
<b>87.8 ⇒ 85.2</b>	<b>Victim becomes irrational, loses contact with environment, drifts into stupor; muscular rigidity continues; pulse and respiration slowed.</b>	<b>Blueness of skin. Decreased heart and respiratory rate. Dilation of pupils. Weak or irregular pulse. Stupor.</b>	<b>Blueness of skin. Slow, irregular, or weak pulse. Drowsiness.</b>
<b>85.2 ⇒ 78.8</b>	<b>Unconsciousness; does not respond to spoken word; most reflexes cease to function; heartbeat becomes erratic.</b>	<b>Unconsciousness.</b>	
<b>78.8 ↓</b>	<b>Failure of cardiac and respiratory control centers in brain; cardiac fibrillation; probable edema and hemorrhage in lungs; apparent death.</b>		

# Frostbite

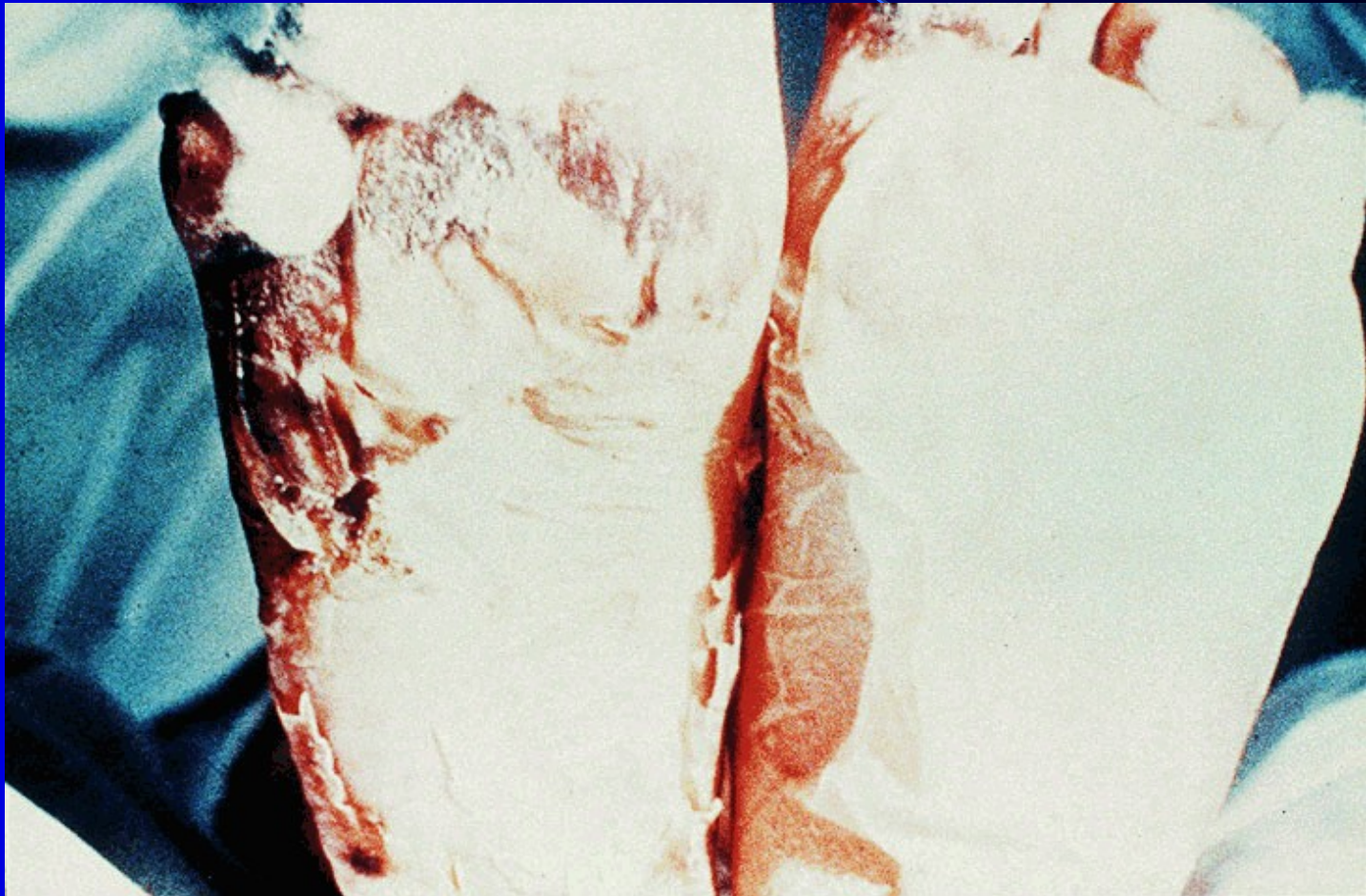
- Air temps below 32°F
  - skin freezes at 28°F
- Superficial frostbite (mild)
  - freezing of skin surface
- Deep frostbite (severe)
  - freezing of skin and flesh, may include bone
- Hands, fingers, feet, toes, ears, chin, nose, groin area

# Frostbite

- Symptoms

- initially redness in light skin or grayish in dark skin
- tingling, stinging sensation
- turns numb, yellowish, waxy or gray color
- feels cold, stiff, woody
- blisters may develop

# Deep Frostbite





# Frostbite

- Treatment

- remove from cold and prevent further heat loss
- remove constricting clothing and jewelry
- rewarm affected area evenly with body heat until pain returns
  - when skin thaws it hurts!!
  - do not rewarm a frostbite injury if it could refreeze during evacuation or if victim must walk for medical treatment
- do not massage affected parts or rub with snow
- evacuate for medical treatment



# Frostbite



# Frostbite

- Prevention

- wear uniform properly (layers and loosely)
- keep socks and clothing dry (use poly pro/thermax liner socks and foot powder/ change insoles also)
- protect yourself from wind
- keep face and ears covered and dry
- drink hot fluids and eat often
- keep active
- insulate yourself from the ground (sleeping pad/tree branches etc...)
- “Buddy System”
- caution skin contact with super-cooled metals or fuel
- Use approved gloves to handle POL
- seek medical aid for all suspected cases

# Chilblains

- Nonfreezing cold injury
- Cold, wet conditions (between 32-60°F, high humidity)
- Repeated, prolonged exposure of bare skin
- Can develop in only a few hours
- Ears, nose, cheeks, hands and feet

# Chilblains

- Symptoms:
  - initially pale and colorless
  - worsens to achy, prickly sensation then numbness
  - red, swollen, hot, itchy, tender skin upon rewarming
  - blistering in severe cases

# Chilblains

- Treatment
  - prevent further exposure
  - wash, dry gently
  - rewarm (apply body heat)
  - don't massage or rub
  - dry sterile dressing
  - seek medical aid

# Chilblains

- Prevention
  - keep dry and warm
  - cover exposed skin
  - wear uniform properly
  - use the “Buddy System”

# Trench/Immersion Foot

- Potentially crippling, nonfreezing injury (temps from 50°F-32°F)
- Prolonged exposure of skin to moisture (12 or more hours)
- High risk during wet weather, in wet areas, or sweat accumulated in boots or gloves

# Trench/Immersion Foot

- Symptoms

- initially appears wet, soggy, white, shriveled
- sensations of pins and needles, tingling, numbness, and then pain
- skin discoloration - red, bluish, or black
- becomes cold, swollen, and waxy appearance
- may develop blisters, open weeping or bleeding
- in extreme cases, flesh dies



# Trench/Immersion Foot



# Trench/Immersion Foot

- Treatment
  - prevent further exposure
  - dry carefully
  - DO NOT break blisters, apply lotions, massage, expose to heat, or allow to walk on injury
  - rewarm by exposing to warm air
  - clean and wrap loosely
  - elevate feet to reduce swelling
  - evacuate for medical treatment

# Trench/Immersion Foot

- Prevention
  - keep feet clean and dry
  - change socks at least every 8 hours or whenever wet and apply foot powder
  - bring extra boots to field - alternate boots from day to day to allow boots to dry.
  - no blousing bands
  - report all suspected cases to leadership

# Dehydration

- A loss of body fluids to the point of slowing or preventing normal body functions
- Increases chance of becoming a cold weather casualty (especially hypothermia)

# Dehydration

- Symptoms

- dark urine
- headache
- dizziness, nausea
- weakness
- dry mouth, tongue, throat, lips
- lack of appetite
- stomach cramps or vomiting
- irritability
- decreased amount of urine being produced
- mental sluggishness
- increased or rapid heartbeat
- lethargic
- unconsciousness

# Dehydration

- Treatment
  - drink WATER or other warm liquids
  - water should be sipped, not gulped
  - do not eat snow
  - Rest
  - get medical treatment

# Dehydration

- Prevention

- drink minimum of 3 canteens of water daily for inactivity and 5-6 quarts for activity
- monitor urine color
- do not wait until you are thirsty
- drink hot liquids for warmth



# Carbon Monoxide Poisoning

- When oxygen in the body is replaced by carbon monoxide
  - colorless, odorless, tasteless gas resulting from incomplete combustion
- Inadequate ventilation from engines, stoves, heaters





# Carbon Monoxide Poisoning

- Symptoms

- headache
- dizziness
- weakness
- excessive yawning
- ringing in ears
- confusion
- nausea
- bright red lips, eyelids
- grayish tint in dark-skinned people
- drowsiness
- unconsciousness
- possibly death

# Carbon Monoxide Poisoning

- Treatment
  - move to fresh air immediately
  - seek medical aid promptly
  - provide mouth-to-mouth resuscitation if victim is not breathing

# Carbon Monoxide Poisoning

- Prevention

- ensure proper ventilation
- don't use unvented heaters or engines
- ensure heaters are regularly serviced
- turn heaters off when not needed (during sleep)
- if heater kept on during sleep, post a fire guard
- never sleep in vehicle with engine running
- never wrap poncho around vehicle exhaust to collect heat

# Snow Blindness

- Inflammation and sensitivity of the eyes caused by ultraviolet rays of the sun reflected by the snow or ice
- Symptoms
  - gritty feeling in eyes
  - redness and tearing
  - eye movement will cause pain
  - headache

# Snow Blindness

- Treatment

- remove from sunlight
- blindfold both eyes or cover with cool, wet bandages
- seek medical attention
- recovery may take 2-3 days

- Prevention

- eye protection
  - dark, UV protective glasses
  - field expedient-cut narrow slits in MRE cardboard and tie around head
- do not wait for discomfort to begin

# Sunburn

- Burning of the skin due to overexposure to the sun and UV light
- Contributing factors
  - fair skin, light hair
  - exposed skin
  - reflective qualities of the snow
  - high altitudes
- Symptoms
  - redness of skin, slight swelling (1<sup>st</sup> deg)
  - prolonged exposure (2<sup>nd</sup> deg)
    - pain and blistering
    - chills, fever, headache

# Sunburn

- Treatment

- soothing skin creams in mild cases
- in severe cases, seek medical attention
- ibuprofen for pain

- Prevention

- cover exposed skin with clothing
- sunscreen, lip balm
- limit exposure of skin to the environment

# Conclusion

- Dress properly
- Drink plenty of fluids
- Eat right
- Keep in shape
- Get plenty of rest
- Minimize periods of inactivity
- Maintain a positive attitude



# Reference Materials

- Technical Note No. TN02-2 *Sustaining Health and Performance in Cold-Weather Operations (October 2001)*
- TC 21-3 *Soldier's Handbook for Individual Operations and Survival in Cold-Weather Areas*
- FM 31-70 *Basic Cold Weather Manual*
- FM 21-10 *Field Hygiene and Sanitation*
- FM 21-11 *First Aid for Soldiers*
- TB MED 81 *Cold Injury*

# QUESTIONS?

